

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte PHILIPPE GAMBIER

Appeal 2007-2971
Application 10/675,559
Technology Center 3600

Decided: October 31, 2007

Before EDWARD C. KIMLIN, CATHERINE Q. TIMM, and
LINDA M. GAUDETTE, *Administrative Patent Judges*.

GAUDETTE, *Administrative Patent Judge*.

DECISION ON APPEAL

1 This is an appeal from the final rejection of claims 1-3, 6, 8-16, 20-38, and 40-46. Claims 4, 5, 7, 18, and 19 are also pending but have been withdrawn from consideration. We have jurisdiction under 35 U.S.C. § 6(b).

We AFFIRM.

BACKGROUND

The invention relates to an apparatus and method for sealing control line or cable connections. Specification 2-3. Claims 1 and 15 are illustrative of the invention and are reproduced below:

1. An apparatus comprising:

a cable having an outer surface; and

a seal assembly, comprising

a thermoplastic seal;

a preload member adapted to apply a force to and induce cold flow of the thermoplastic seal to seal against the outer surface of the cable.

15. A method for sealing, comprising:

providing a control line having an outer surface, the control line comprising at least one of a hydraulic line, fiber optic line, and electrical line;

providing a seal having a component formed of a thermoplastic;

inducing cold flow deformation of the component to create a fluidic seal against the outer surface of the control line.

The Examiner relies on the following prior art references to show unpatentability:

Taylor	3,298,716	Jan. 17, 1967
Wadahara	6,384,128 B1	May 7, 2002
Evans	6,861,131 B2	Mar. 1, 2005

Admitted Prior Art (APA), see "Related Art" section of instant Specification.

The Examiner made the following rejections:

1. Claims 1-3, 6, 15, 16, 20, 28, 29, 37, and 38 under 35 U.S.C. § 103 as unpatentable over the APA in view of Taylor.
2. Claims 8-13, 21-26, 30-35, and 40-45 under 35 U.S.C. § 103 as unpatentable over the APA in view of Taylor and further in view of Evans.
3. Claims 8, 9, 14, 21, 22, 27, 30, 31, 36, 40, 41 and 46 under 35 U.S.C. § 103 as unpatentable over the APA in view of Taylor and further in view of Wadahara.

The Examiner finds that the APA discloses the invention as claimed in each of independent claims 1, 15, 28, and 38, with the exception that the sealing assembly of the APA does not include “a thermoplastic seal and adjacent ferrule, and a preload member (threaded mandrel) for inducing cold flow of the thermoplastic seal.” (Answer 3). The Examiner further finds that Taylor discloses a sealing assembly comprising the aforementioned features. (Answer 3). The Examiner contends that one of ordinary skill in the art at the time of the invention would have been motivated to replace the sealing assembly of the APA with Taylor’s sealing assembly in order to improve sealing between the APA housing and cable or control line. (Answer 3-4).

Appellant contends that the Examiner has not established a prima facie showing of obviousness because the Examiner’s reasons for combining the applied prior art are based on improper hindsight reconstruction. (Br. 5).

With respect to dependent claims 8-14, 21-27, 30-36, and 40-46, the Examiner finds that Taylor invites the usage of thermoplastic materials other than polypropylene. The Examiner thus contends that it would have been within the skill of the ordinary artisan to have selected the specific thermoplastic materials recited in Appellant’s dependent claims. (Answer 4 and 5). The Examiner also relies on both Evans and Wadahara as evidence that the claimed thermoplastic materials were known equivalents to polypropylene at the time of the invention. (Answer 4 and 5).

Appellant contends that the Examiner has not established a prima facie showing of obviousness because the Examiner has not identified any teaching or suggestion that would have led one of ordinary skill in the art to conclude that the thermoplastic materials described in Evans and Wadahara could be used in a downhole application. (Reply 3).

ISSUES

Based on the contentions of the Examiner and the Appellant, the issues before us are:

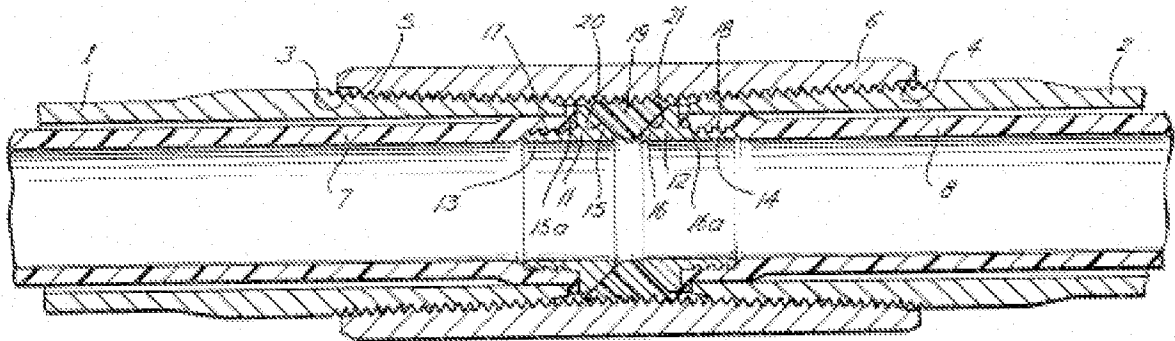
1. Has the Examiner identified a proper teaching, suggestion, or motivation to replace the sealing assembly of the APA with that of Taylor to achieve the invention recited in claims 1-3, 6, 15, 16, 20, 28, 29, 37, and 38?
2. Has the Examiner identified a proper teaching suggestion or motivation to use PEEK, PEK, PPS, PEKEEK, or PET as the material for the thermoplastic seal in the APA/Taylor apparatus or sealing method recited in claims 8-14, 21-27, 30-36, and 40-46?

For the reasons discussed below, we answer these questions in the affirmative.

RELEVANT FINDINGS OF FACT

- 1) Downhole control lines or cables (such as hydraulic, fiber optic and electric) frequently pass through or connect to downhole tools. (APA, Specification 2, ll. 7-9). “[C]onnections often serve as the weak point in the system in terms of reliability. A failure of a seal in a control line connection may cause the complete system to fail.” (APA, Specification 2, ll. 9-11).

- 2) Known prior art “downhole seals include rubber or elastomeric seals, metal-to-metal seals, and seals that rely upon well fluid pressure to create the seal.” (APA, Specification 2, ll. 12-13).
- 3) Another known type of downhole seal, typically formed of elastomers or thermoplastics, relies on fluid pressure to create the seal.¹ (APA, Specification 3, ll. 1-3).
- 4) Taylor “relates to pipe lined with a thermoplastic material and to the method of securing such thermoplastic material within the pipe and to the method of joining two sections of pipe having such thermoplastic lining together to form a corrosion resistant pressure-tight joint.” (Col. 1, ll. 16-21).
- 5) According to Taylor, the “invention is particularly suitable for use in production tubing for oil and gas wells.” (Col. 1, ll. 22-23).
- 6) Figure 6 of Taylor is shown below:



¹ U.S. 6,406,028 is exemplary of this type of seal. APA, Specification 3, ll. 1-2. U.S. 6,406,028 discloses the use of PEEK as a suitable material for use in a seal.

- 7) Taylor Figure 6 shows a cross-sectional view of a pipe joint constructed and joined in accordance with the disclosed invention. (Col. 2, ll. 11-12). Pipes 1 and 2 are connected by coupling 6. (Col. 2, ll. 16-19). Liner 7 is positioned in pipe 1 and liner 8 is positioned in pipe 2. (Col. 2, ll. 19-20). Ferrules 11 and 12 are annular and include tubular body portions 13 and 14 and protruding frustoconical nose portions 15 and 16 having shoulders 15a and 16a which engage the formed ends of the liners 7 and 8. (Col. 2, ll. 36-40). A gasket 19 is positioned in compressed form between the conical surfaces 10 and 21 of ferrules 11 and 12 and the interior of coupling 6. (Col. 2, ll. 60-62).
- 8) Taylor discloses that the liner may be made of “any suitable thermoplastic material which will be resistant to the corrosive conditions to which it is to be exposed.” (Col. 2, ll. 20-22). According to Taylor, “polypropylene has been found to be suitable as a lining on pipe.” (Col. 2, ll. 23-24).
- 9) According to Taylor, the gasket is preferably made from the same material as the liners 7 and 8, but may be made of any material which is resistant to the corrosion conditions to which the pipe is to be exposed and which will deform or cold flow when compressed within a pipe joint to seal the interior of the joint. (Col. 2, ll. 65-71).
- 10) Taylor discloses that the ferrules 11 and 12 are preferably made of a completely corrosion resistant material such as a metal material. (Col. 2, ll. 48-51).
- 11) Taylor discloses formation of a pressure tight seal as follows:

Pipe 1 is [] threaded into coupling 6 and rotated in the direction to tighten threads 3 within coupling 6 while pipe 2 is held stationary. This tightening action will move the conical surfaces 20 and 21 of ferrules 11 and 12 against gasket 19 whereby gasket 19 will be compressed and will deform into the shape shown in FIGURES 1 and 6 whereby a complete seal is maintained on surfaces 20 and 21 and also gasket 19 is wedged outwardly by surfaces 20 and 21 against the interior of coupling 6. (Col. 4, l. 72-col. 5, l. 5).

ANALYSIS AND CONCLUSIONS

Issue 1: Has the Examiner identified a proper teaching, suggestion, or motivation to replace the sealing assembly of the APA with that of Taylor to achieve the invention recited in independent claims 1-3, 6, 15, 16, 20, 28, 29, 37, and 38?

Recently, in *KSR Int'l Co. v. Teleflex Inc.*, the Supreme Court set aside any “rigid” application of the teaching, suggestion, motivation (“TSM”) test, advising that: “A person of ordinary skill is also a person of ordinary creativity, not an automaton.” 127 S. Ct. 1727, 1742 (2007). The Supreme Court clarified that while “it can be important to identify a reason that would have prompted a person of ordinary skill in the relevant field to combine the elements in the way the claimed new invention does. . . . the analysis need not seek out precise teachings [in the prior art] directed to the specific subject matter of the challenged claim.” *Id.* at 1741.

Appellant does not dispute the Examiner’s finding that all of the elements recited in independent claims 1, 15, 28, and 38 may be found in the combined disclosures of the APA and Taylor.² Rather, Appellant contends

² Appellant states that the following groups of claims are separately patentable: (1) 1-3 and 6, (2) 15, 16, and 20, (3) 28, 29, and 37, and (4) 38.

that neither the APA nor Taylor provide the requisite suggestion to combine the teachings thereof to achieve the claimed invention. (Reply 2).

Appellant further contends that the Examiner “has cited to no objective evidence that would establish what [the] ‘knowledge generally available to one of ordinary skill’ would include, and how such ‘knowledge’ would have suggested a [sic] modifying APA with the teachings of Taylor.” (Reply 2).

Contrary to Appellant, we find that the Examiner’s reasons for combining the applied prior art are properly based on a consideration of the interrelated teachings thereof, known problems in the prior art and the background knowledge possessed by a person having ordinary skill in the art. *See KSR*, 127 S. Ct. at 1740-41. *See also, DyStar*, 464 F.3d at 1366-67 (holding that a reason to combine may come from “the knowledge of one of ordinary skill in the art,” “the nature of the problem to be solved,” or “common knowledge and common sense”). More specifically, we find that the Examiner identified a known drawback of prior art seals (“subject to failure”) and the knowledge generally available to one of ordinary skill in the art (“corrosion resistance via the thermoplastic seal material; enhanced pressure-tightness and thus sealing via the cooperation [sic] of the preload member, ferrules, and resulting cold flow of the thermoplastic seal; and ease in assembly/disassembly [sic] via the structural cooperation of the preload member, ferrules [sic], and thermoplastic seal”). (Answer 7; *see* Findings of Fact 1, 4, and 6-11). The Examiner then reasonably concluded that one of ordinary skill in the art would have been motivated to replace the seal of the *See* Br. 4-8. However, Appellant’s separate arguments are limited to the assertion that *neither* the APA *nor* Taylor suggests all of the claimed features. *See* 37 C.F.R. § 41.37(c)(1)(vii) (“A statement which merely points out what a claim recites will not be considered an argument for separate patentability of the claim.”).

APA with Taylor's seal "to improve sealing between the housing and cable or control line of the APA." (Answer 7). Accordingly, we find that the Examiner established a prima facie showing of obviousness as to claims 1-3, 6, 15, 16, 20, 28, 29, 37, and 38.

Issue 2: Has the Examiner identified a proper teaching suggestion or motivation to use PEEK, PEK, PPS, PEKEEK, or PET as the material for the thermoplastic seal in the APA/Taylor apparatus or sealing method recited in claims 8-14, 21-27, 30-36, and 40-46?

With respect to the remaining dependent claims on appeal, the Examiner finds that the APA, as modified by Taylor, fails to specifically disclose the thermoplastic material as PEEK, PEK, PPS, PEKEEK, or PET, as claimed. (Answer 4 and 5). However, the Examiner concludes that "the specific thermoplastic material is not a critical feature of the appellant's invention, and the selection of a known material based upon its suitability for the intended use is a design consideration within the skill of the art." (Answer 4 and 5). The Examiner specifically notes that Taylor discloses the use of polypropylene and also "invites the usage of thermoplastic materials other than polypropylene." (Answer 4 and 5; *see* Findings of Fact 8 and 9). Thus, the Examiner maintains that the use of thermoplastic materials which were known equivalents of polypropylene (e.g., PEEK, PEK, PPS, PEKEEK, or PET) in the APA/Taylor sealing assembly/method would have been obvious to one of ordinary skill in the art at the time of the invention. (Answer 4-5). The Examiner relies on Evans as evidence that PEEK, PEK, PPS, and PEKEEK were known equivalents of polypropylene (Answer 4) and on Wadahara as evidence that PEEK, PEK, PPS, and PET were known equivalents of polypropylene (Answer 5).

Appellant argues that “[t]here is no suggestions whatsoever that the thermoplastic materials described in Evans can be used in a downhole application.” (Reply 3). Appellant further argues that the Examiner has not cited to any objective evidence that would have suggested the incorporation of the PET material of Wadahara into APA and Taylor.” (Reply 3). However, Appellant has not presented arguments or evidence to refute the Examiner’s finding that the ordinary artisan would have been familiar with the properties of polypropylene as well as alternative thermoplastic materials such as PEEK, PEK, PPS, PEKEEK, and PET and would have appreciated that any one of these materials would have been suitable for use in the APA/Taylor sealing assembly and method (Answer 4 and 5-6; *see* Finding of Fact 3 n.1). *See KSR*, 127 S. Ct. at 1741 (An obviousness analysis “can take account of the inferences and creative steps that a person of ordinary skill in the art would employ.”). Accordingly, we find that the Examiner has established a *prima facie* showing of obviousness as to claims 8-14, 21-27, 30-36, and 40-46, which Appellant has failed to overcome.

ORDER

The rejection of claims 1-3, 6, 15, 16, 20, 28, 29, 37, and 38 under 35 U.S.C. § 103 as unpatentable over the APA in view of Taylor is affirmed.

The rejection of claims 8-13, 21-26, 30-35, and 40-45 under 35 U.S.C. § 103 as unpatentable over the APA in view of Taylor and further in view of Evans is affirmed.

The rejection of claims 8, 9, 14, 21, 22, 27, 30, 31, 36, 40, 41 and 46 under 35 U.S.C. § 103 as unpatentable over the APA in view of Taylor and further in view of Wadahara is affirmed.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a)(i)(iv).

AFFIRMED

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